```
=> s raffinose synthase

L1            8 RAFFINOSE SYNTHASE

=> s transgenic

L2         52105 TRANSGENIC

=> s l1 and l2

L3            1 L1 AND L2

=> d l3
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L3    ANSWER 1 OF 1  CAPLUS   COPYRIGHT 1998 ACS
AN    1998:217308  CAPLUS
DN    128:318794
TI    Cloning of cDNA for raffinose synthase from
      cucumber, and its use for preparing raffinose or transgenic
      plants low in raffinose-type oligosaccharides
IN    Oosumi, Chieko; Nozaki, Shinji; Kida, Takao
PA    Ajinomoto Co., Inc., Japan
SO    Jpn. Kokai Tokkyo Koho, 26 pp.
      CODEN: JKXXAF
PI    JP 10084973 A2  980407  Heisei
AI    JP 97-111124  970428
PRAI  JP 96-107682  960426
      JP 96-198079  960726
DT    Patent
LA    Japanese
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=> d l1 1-8
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L1    ANSWER 1 OF 8  BIOSIS   COPYRIGHT 1998 BIOSIS
AN    98:339293  BIOSIS
DN    01339293
TI    Characterization and gene cloning of raffinose
      synthase from Cucumis sativus.
AU    Ohsumi C; Nozaki J; Kida T
CS    Ajinomoto Co. Inc., CRL., Kawasaki 210, Japan
SO    1998 Annual Meeting of the Japanese Society of Plant Pathologists,
      Tokyo, Japan, May 3-5, 1998. Plant and Cell Physiology 39 (SUPPL.).
      1998.  S131. ISSN: 0032-0781
DT    Conference
LA    English
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L1    ANSWER 2 OF 8  BIOSIS   COPYRIGHT 1998 BIOSIS
AN    98:339292  BIOSIS
DN    01339292
TI    Purification of raffinose synthase from Cucumis
      sativus leaves.
AU    Nozaki J; Ohsumi C; Kida T
CS    Ajinomoto Co. Inc., CRL., Kawasaki 210, Japan
SO    1998 Annual Meeting of the Japanese Society of Plant Pathologists,
      Tokyo, Japan, May 3-5, 1998. Plant and Cell Physiology 39 (SUPPL.).
      1998.  S131. ISSN: 0032-0781
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DT  Conference
LA  English


L1  ANSWER 3 OF 8  BIOSIS  COPYRIGHT 1998 BIOSIS
AN  90:197835  BIOSIS
DN  BA89:104506
TI  **RAFFINOSE SYNTHASE** AND GALACTINOL SYNTHASE IN
    DEVELOPING SEEDS AND LEAVES OF LEGUMES.
AU  CASTILLO E M; DE LUMEN B O; REYES P S; DE LUMEN H Z
CS  DEP. NUTRITIONAL SCI., UNIV. CALIFORNIA, BERKELEY, CALIF. 94720.
SO  J AGRIC FOOD CHEM 38 (2). 1990.  351-355. CODEN: JAFCAU ISSN:
    0021-8561
LA  English


L1  ANSWER 4 OF 8  AGRICOLA
AN  91:43724  AGRICOLA
DN  IND91018838
TI  **Raffinose synthase** and galactinol synthase in
    developing seeds and leaves of legumes.
AU  Castillo, E.M.; Lumen, B.O. de; Reyes, P.S.; Lumen, H.Z. de
CS  University of The Philippines, Los Banos, Los Banos, The Philippines
AV  DNAL (381 J8223)
SO  Journal of agricultural and food chemistry, Feb 1990. Vol. 38, No.
    2. p. 351-355
    Publisher: Washington, D.C. : American Chemical Society.
    CODEN: JAFCAU; ISSN: 0021-8561
NTE Includes references.
DT  Article
FS  U.S. Imprints not USDA, Experiment or Extension
LA  English


L1  ANSWER 5 OF 8  CAPLUS  COPYRIGHT 1998 ACS
AN  1998:217308  CAPLUS
DN  128:318794
TI  Cloning of cDNA for **raffinose synthase** from
    cucumber, and its use for preparing raffinose or transgenic plants
    low in raffinose-type oligosaccharides
IN  Oosumi, Chieko; Nozaki, Shinji; Kida, Takao
PA  Ajinomoto Co., Inc., Japan
SO  Jpn. Kokai Tokkyo Koho, 26 pp.
    CODEN: JKXXAF
PI  JP 10084973 A2  980407  Heisei
AI  JP 97-111124  970428
PRAI JP 96-107682  960426
    JP 96-198079  960726
DT  Patent
LA  Japanese


L1  ANSWER 6 OF 8  CAPLUS  COPYRIGHT 1998 ACS
AN  1992:55624  CAPLUS
DN  116:55624
TI  Distribution and immunolocalization of stachyose synthase in Cucumis
    melo L
AU  Holthaus, Uta; Schmitz, Klaus
CS  Bot. Inst., Univ. Koeln, Cologne, W-5000/41, Germany
SO  Planta (1991), 185(4), 479-86
    CODEN: PLANAB; ISSN: 0032-0935
DT  Journal
LA  English


L1  ANSWER 7 OF 8  CAPLUS  COPYRIGHT 1998 ACS
AN  1990:115882  CAPLUS
DN  112:115882
TI  **Raffinose synthase** and galactinol synthase in
    developing seeds and leaves of legumes

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AU    Castillo, Eugenia M.; De Lumen, Benito O.; Reyes, Pilar S.; De
      Lumen, Helen Z.
CS    Dep. Nutr. Sci., Univ. California, Berkeley, CA, 94720, USA
SO    J. Agric. Food Chem. (1990), 38(2), 351-5
      CODEN: JAFCAU; ISSN: 0021-8561
DT    Journal
LA    English
OS    CJACS


L1    ANSWER 8 OF 8  WPIDS   COPYRIGHT 1998 DERWENT INFORMATION LTD
AN    98-264858 [24]   WPIDS
DNN   N98-208774      DNC C98-082361
TI    Raffinose synthase gene - useful for preparation
      of raffinose in transformed plant.
DC    C06 D16 P13
PA    (AJIN) AJINOMOTO KK
CYC   1
PI    JP 10084973 A   980407 (9824)*      26 pp      C12N015-09
ADT   JP 10084973 A JP 97-111124 970428
PRAI  JP 96-198079   960726; JP 96-107682   960426
IC    ICM  C12N015-09
      ICS  A01H005-00; C12N009-00


=> s raffinose

L4         6845 RAFFINOSE

=> s synthase

L5        89205 SYNTHASE

=> s 14 and 15

L6          107 L4 AND L5

=> s transgenic

L7        52105 TRANSGENIC

=> s 16 and 17

L8            3 L6 AND L7

=> d 18 1-3


L8    ANSWER 1 OF 3  CAPLUS   COPYRIGHT 1998 ACS
AN    1998:217308  CAPLUS
DN    128:318794
TI    Cloning of cDNA for raffinose synthase from
      cucumber, and its use for preparing raffinose or
      transgenic plants low in raffinose-type
      oligosaccharides
IN    Oosumi, Chieko; Nozaki, Shinji; Kida, Takao
PA    Ajinomoto Co., Inc., Japan
SO    Jpn. Kokai Tokkyo Koho, 26 pp.
      CODEN: JKXXAF
PI    JP 10084973 A2   980407  Heisei
AI    JP 97-111124   970428
PRAI  JP 96-107682   960426
      JP 96-198079   960726
DT    Patent
LA    Japanese

L8    ANSWER 2 OF 3  CAPLUS   COPYRIGHT 1998 ACS
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AN    1993:553371   CAPLUS
DN    119:153371
TI    Nucleotide sequences for galactinol **synthase** from zucchini
      and soybean
IN    Kerr, Phillip S.; Pearlstein, Richard W.; Schweiger, Bruce J.;
      Becker-Manley, Mary F.; Pierce, John W.
PA    du Pont de Nemours, E. I., and Co., USA
SO    PCT Int. Appl., 79 pp.
      CODEN: PIXXD2
PI    WO 9302196 A1   930204
DS    W:  AU, BB, BG, BR, CA, CS, FI, HU, JP, KP, KR, LK, MG, MN, MW, NO,
          PL, RO, RU, SD, US
      RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, DE, DK, ES, FR, GA, GB, GR,
          IT, LU, MC, ML, MR, NL, SE, SN, TD, TG
AI    WO 92-US6057   920724
PRAI  US 91-735066   910724
DT    Patent
LA    English


L8    ANSWER 3 OF 3   WPIDS    COPYRIGHT 1998 DERWENT INFORMATION LTD
AN    93-058793 [07]   WPIDS
DNN   N93-044772       DNC C93-026307
TI    Nucleotide sequence of galactinol **synthase** from zucchini
      and soybean - used to produce plants having altered levels of
      **raffinose** saccharide(s) and/or sucrose.
DC    C06 D16 P13
IN    BECKER-MANLEY, M F; KERR, P S; PEARLSTEIN, R W; PIERCE, J W;
      SCHWEIGER, B J
PA    (DUPO) DU PONT DE NEMOURS & CO E I
CYC   37
PI    WO 9302196   A1 930204 (9307)* EN    80 pp      C12N015-54
          RW: AT BE CH DE DK ES FR GB GR IT LU MC NL OA SE
          W:  AU BB BG BR CA CS FI HU JP KP KR LK MG MN MW NO PL RO RU SD
              US
      AU 9224205   A   930223 (9324)              C12N015-54
      ZA 9205592   A   940330 (9417)      76 pp   C07H000-00
      EP 604458    A1  940706 (9426)   EN         C12N015-54
         R: FR
      US 5648210   A   970715 (9734)      24 pp   C12Q001-68
      US 5773699   A   980630 (9833)              A01H001-04
ADT   WO 9302196 A1 WO 92-US6057 920724; AU 9224205 A AU 92-24205 920724;
      ZA 9205592 A ZA 92-5592 920724; EP 604458 A1 EP 92-917170 920724, WO
      92-US6057 920724; US 5648210 A WO 92-US6057 920724, US 94-182060
      940823; US 5773699 A Cont of US 91-735066 910724, Cont of WO
      92-US6057 920724, Cont of US 94-182060 940823, US 96-712702 960912
FDT   AU 9224205 A Based on WO 9302196; EP 604458 A1 Based on WO 9302196;
      US 5648210 A Based on WO 9302196; US 5773699 A Cont of US 5648210
PRAI  US 91-735066   910724; US 94-182060   940823; US 96-712702   960912
IC    ICM  A01H001-04; C07H000-00; C12N015-54; C12Q001-68
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           C12N015-11; C12N015-29; C12N015-82; C12P019-18; C12P019-34


=> d 18 2-3 ab


L8    ANSWER 2 OF 3  CAPLUS  COPYRIGHT 1998 ACS

AB    The cDNA for zucchini leaf and soybean seed galactinol
      **synthase** (I) are cloned and expressed in a
      **transgenic** plant or a host cell using an appropriate
      regulatory sequence.  The plant or plant cell transformed with the
      cDNA operatively linked to a promoter, e.g., the 35S promoter, may
      have a varied level of I and thus the desirable levels of
      **raffinose** saccharides and sucrose.  Nucleotide fragments
      derived from the cDNA can be used for RFLP breeding of altered
      levels of **raffinose** saccharides and sucrose traits in

soybeans. I may also be prepd. in a host, e.g., Escherichia coli, and used for prepg. galactinol.

L8   ANSWER 3 OF 3  WPIDS   COPYRIGHT 1998 DERWENT INFORMATION LTD
AB   WO 9302196 A   UPAB: 931119

An isolated nucleic acid fragment (I) comprising a nucleotide seqeunce encoding plant galactinol **synthase** (GaS) is new.

Also claimed are: (1) a chimeric gene (II) capable of being expressed in transformed plants, comprising (I) operably linked to a suitable regulatory sequence; (2) a chimeric gene capable of being expressed in transformed plants, comprising a nucleic acid fragment encoding antisense RNA complementary to plant GaS; (3) a chimeric gene (IV) capable of being expressed in transformed microorganisms, comprising (I) operably linked to a suitable regulatory sequence; (4) plants transformed with (II) and (III) respectively; (5) seeds obtd. from the plants of (4); (6) a microorganism transformed with (IV); (7) methods for obtaining plants and plant cells contg. altered levels of **raffinose** saccharides and/or sucrose; (8) 2 methods for producing galactinol; (9) a method of RfLP breeding of altered levels of **raffinose** saccharides and sucrose traits in soybeans; (10) a method of varying the level of D-galactase contg. oligosaccharides of sucrose in plants in response to end-user requirements.

USE/ADVANTAGE - **Transgenic** plants that produce higher than normal levels of **raffinose** saccharides possess enhanced cold tolerance and in coniferous species will result in reduced post harvest needle abscission. **Transgenic** plants that produce lower than normal levels of **raffinose** saccharide are more easily digestible and have larger amts. of metabolisable energy. In sugar beets in particular, a decrease in **raffinose** saccharide content would improve sucrose crystallisation and overcome the need for expensive processing of sugar beet extracts. The enzyme can be used for prodn. of galactinol, and the nucleic acid fragments can be used as RELP markers in soybean genetic studies and breeding programs
Dwg.0/3

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🔍 *Yeast*
  🔍 Volume 8
      Issue 2

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# IMP2, a nuclear gene controlling the mitochondrial dependence of galactose, maltose and raffinose utilization in Saccharomyces cerevisiae.

Donnini C, Lodi T, Ferrero I, Puglisi PP

## Abstract

The IMP2 gene of Saccharomyces cerevisiae is involved in the nucleo-mitochondrial control of maltose, galactose and raffinose utilization as shown by the inability of imp2 mutants to grow on these carbon sources in respiratory-deficient conditions or in the presence of ethidium bromide and erythromycin. The negative phenotype cannot be scored in the presence of inhibitors of respiration and oxidative phosphorylation, indicating that the role of the mitochondria in the utilization of the above-mentioned carbon sources in imp2 mutants is not at the energetical level. Mutations in the IMP2 gene also confer many phenotypic alterations in respiratory-sufficient conditions, e.g. leaky phenotype on oxidizable carbon sources, sensitivity to heat shock and sporulation deficiency. The IMP2 gene has been cloned, sequenced and disrupted. The phenotype of null imp2 mutants is indistinguishable from that of the originally isolated mutant.

## MeSH

Amino Acid Sequence ; Base Sequence ; **Carbohydrates** ; Galactose ; **Genes, Fungal** ; Genetic Complementation Test ; Maltose ; **Mitochondria** ; Molecular Sequence Data ; Mutation ; Phenotype ; Plasmids ; Raffinose ; **Saccharomyces cerevisiae** ; Support, Non-U.S. Gov't ;

## Author Address

Istituto di Genetica, Universita di Parma, Italy.

## Secondary Source (links)

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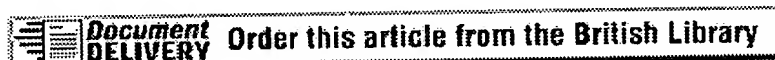
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NCBI *Entrez*     Nucleotide QUERY               BLAST Entrez ?

**Other Formats:** FASTA   Graphic

**Links:** MEDLINE   Protein   Related Sequences

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LOCUS       SCIMP2        2071 bp      DNA              PLN        18-AUG-1993
DEFINITION  S. cerevisiae IMP2 gene.
ACCESSION   X61928 S94332
NID         g3829
KEYWORDS    IMP2 gene.
SOURCE      baker's yeast.
  ORGANISM  Saccharomyces cerevisiae
            Eukaryotae; mitochondrial eukaryotes; Fungi; Ascomycota;
            Hemiascomycetes; Saccharomycetales; Saccharomycetaceae;
            Saccharomyces.
REFERENCE   1  (bases 1 to 2071)
  AUTHORS   Lodi,T.
  TITLE     Direct Submission
  JOURNAL   Submitted (04-SEP-1991) T. Lodi, Inst di Genetica, Viale dele
            Scienze, I-43100 Parma, ITALY
REFERENCE   2  (bases 1 to 2071)
  AUTHORS   Donnini,C., Lodi,T., Ferrero,I. and Puglisi,P.P.
  TITLE     IMP2, a nuclear gene controlling the mitochondrial dependence of
            galactose, maltose and raffinose utilization in Saccharomyces
            cerevisiae
  JOURNAL   Yeast 8 (2), 83-93 (1992)
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NCBI *Entrez*　　Nucleotide QUERY　　BLAST Entrez ?

**Other Formats:** FASTA | Graphic

**Links:** Protein | Related Sequences

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LOCUS        PPSURFOP      21839 bp    DNA              BCT       24-MAY-1994
DEFINITION   P.pentosaceus (PPE1.0) sucrose and raffinose operons.
ACCESSION    Z32771
NID          g493728
KEYWORDS     alpha-galactosidase; alpha-glucosidase; enzyme IIabc; fructokinase;
             insertion element; permease; regulator; sucrase.
SOURCE       Pediococcus pentosaceus.
  ORGANISM   Pediococcus pentosaceus
             Eubacteria; Firmicutes; Low G+C gram-positive bacteria;
             Lactobacillaceae; Pediococcus.
REFERENCE    1  (bases 1 to 21839)
  AUTHORS    Leenhouts,K.K.J., Bolhuis,A.A., Kok,J.J. and Venema,G.G.
  TITLE      The sucrose and raffinose operons of Pediococcus pentosaceus PPE1.0
  JOURNAL    Unpublished
REFERENCE    2  (bases 1 to 21839)
  AUTHORS    Leenhouts,K.K.
  TITLE      Direct Submission
  JOURNAL    Submitted (27-APR-1994) Leenhouts K. K., Institute for Biological
             Sciences, Department of Genetics, Kerklaan 30, Haren, The
             Netherlands, 9751 NN
COMMENT      On May 26, 1994 this sequence version replaced gi:475962.
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**NCBI** *Entrez*      Nucleotide QUERY           BLAST Entrez ?

**Other Formats:** | FASTA | | Graphic |
**Links:** | Protein | | Related Sequences |

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DEFINITION  Pediococcus pentosaceus raffinose operon genes.
ACCESSION   L32093
NID         g493181
KEYWORDS    agaR gene; agaS gene; agl gene; alpha-galactosidase;
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            gene; rafR gene; raffinose operon; regulatory protein; scrA gene;
            scrB gene; scrK gene; scrR gene; sucrase; sucrose-6-phosphate;
            transport protein.
SOURCE      Pediococcus pentosaceus (strain PPE1.0) DNA; Insertion sequence
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            kingdom Prokaryotae) DNA; Pediococcus pentosaceus (strain PPE1.0)
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            pentosaceus (strain PPE1.0) DNA.
  ORGANISM  Pediococcus pentosaceus
            Eubacteria; Firmicutes; Low G+C gram-positive bacteria;
            Lactobacillaceae; Pediococcus.
REFERENCE   1  (bases 1 to 21838)
  AUTHORS   Leenhouts,K.J., Bolhuis,A.A., Kok,J.J. and Venema,G.G.
  TITLE     The sucrose and raffinose operons of Pediococcus pentosaceus PPE1.0
  JOURNAL   Unpublished (1994)
COMMENT     On May 25, 1994 this sequence version replaced gi:475106.
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Save the above report in [ Macintosh ▼ ] [ Text ▼ ] format

**Other Formats:**
**Links:**

LOCUS          ECORA

**NCBI** *Entrez*    Nucleotide QUERY    BLAST Entrez ?

**Other Formats:**  | FASTA |  | Graphic |

**Links:**  | MEDLINE |  | Protein |  | Related Sequences |

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DEFINITION  E.coli rafA, rafB, and rafD genes encoding alpha-D-galactosidase,
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ACCESSION   M27273
NID         g147504
KEYWORDS    alpha-D-galactosidase; raf-invertase; raf-permease; rafA gene; rafB
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SOURCE      E.coli (strain K-12) DNA.
  ORGANISM  Escherichia coli
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REFERENCE   1  (bases 1 to 5284)
  AUTHORS   Aslanidis,C., Schmid,K. and Schmitt,R.
  TITLE     Nucleotide sequences and operon structure of plasmid-borne genes
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  JOURNAL   J. Bacteriol. 171, 6753-6763 (1989)
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COMMENT     Draft entry and computer readable copy of sequence [1] kindly
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